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Three ostracod species from Lake Velence new to the fauna of Hungary

By

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ABSTRACT. Three ostracod species new to the Hungarian fauna: Candona holzkampfi Hartwig, 1900, Physocypria fadeewi Dubowsky, 1926 and Potamocypris variegata Brady & Norman, 1889 are reported from Lake Velence.

Hydrobiological analyses of Lake Velence were carried out between 1975 and 1979 on behalf of the Water Management Scientific Research Institute, Budapest. The ostracod species have been identified in the collected samples. In the course of processing the collected material three species have been found which had previously been unknown in the fauna of Hungary. FARKAS (1958), taking into account the ostracod fauna of the surrounding areas, mentioned the possibility of their occurrence.

Only a few samples contained some individuals of Candona holzkampfi Hartwig, 1900, but specimens of Physocypria fadeewi Dubowsky, 1926 and Potamocypris variegata Brady & Norman, 1889 were found in every sample.

Candona holzkampfi Hartwig, 1900
(Podocopa - Cypridacea - Candonidae - Candoninae)*

HARTWIG, 1900: 149; DADAY, 1903: 84, Tab. VI. figs 34-54; VAVRA, 1909: 95, fig. 386; MÜLLER, 1912: 138; DUBOWSKY, 1925: 269; KLIE, 1926: 37-53; KLIE, 1938: 62, figs 197-198; BRONSTEIN, 1947: 243, fig. 147; FARKAS, 1958: 56, fig. 60; NÜCHTERLEIN, 1969: 245.

Synonyms: Eucandona csikii var. pannonica Daday, 1903; Candona fabaeformis Fischer, 1851 (NÜCHTERLEIN, 1969).

Some individuals of the species were found in the sample collected from the soft bottom under a Schoenoplectus littoralis stand near the village Velence (16. 05. 1976). In the taxonomic keys I found that only the male individuals can be distinguished from Candona fabaeformis Fischer. Although only few specimens could be studied I found that the females of the two species can also be clearly distinguished from each other on the basis of their valves. Valves of the females of C. holzkampfi are chopped on the back side from lateral view, more exactly the posterior margin is straight, while in C. fabaeformis they are rounded (Fig. 2c, d). The valve is 0.96 mm long (literature data mention 0.98 mm), its greatest height may be seen in its posterior third, being somewhat less than half of its total length (0.44 mm).

Seen from above, the right and left bend of the edge contour are of the same shape, with its greatest width being in the back third.

The dorsal margin of the left valve of the male is arched and that of the right valve is straight, and forms an angle with the frontal and the back edge (Fig. 2a, b). The ventral side

*On the basis of the classification of HARTMANN & PURI (1974).

is deeply rounded. Length of the valve is 1.47 mm (in literature: 1.06-1.60 mm), its greatest height in the back third of its length is exactly half of its length.

Dimensions of valves of female individuals:

1000 (relative length): 459 (relative height): 305 (relative width) = 0.96 (absolute length in mm): 0.44 (absolute height): 0.29 (absolute width).

Dimensions of valves of male individuals:

1000: 496: 310 = 1.47 : 0.73 : 0.46

The three medial bristles are smooth on the palp of the mandible at the distal end of the second joint. The penultimate joint of the third leg is divided. Two of the three bristles on the last joint are long - 100 : 74 : 41 - (Fig. 2f).

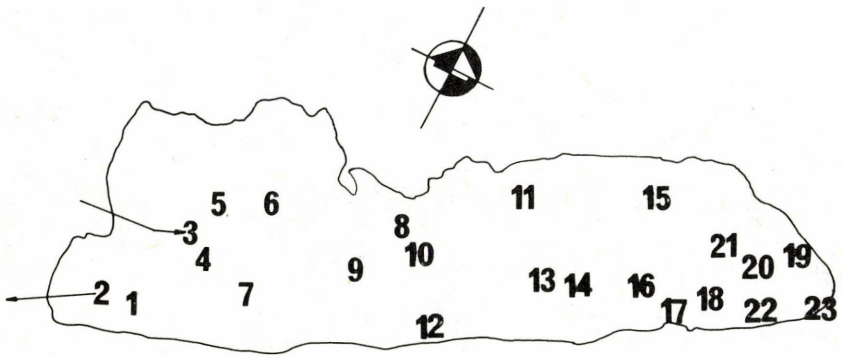

Fig. 1 Map of Lake Velence (1: 40 000)
1-23 numbered points of sampling localities: 1= Alsóéri tisztás, 2= Kajtor csatorna, 3= Császár patak, 4= Lángi tisztás, 5= Német tisztás, 6= Vendel tisztás, 7= Vaskapu, 8= Kiscserepes csapás, 9= Nagytó-Rigya, 10= Hollós tisztás, 11= Nagytisztás, 12= Agárd, 13= Égett nád, 14= Pörös bokra, 15= Felső-tó, 16= Tizedes tanya, 17= Velence, 18= Lucskos, 19= Fürdető, 20= Templomtisztás, 21= Öregtisztás, 22= Schoenoplectus littoralis, 23= Vereb-Pázmándi patak.

Index of furca (Fig. 2e):

$$\frac{X \mid K_f : K_a}{Y \mid S_f : S_a} \mid N \qquad \frac{224 \mid 100 : 74}{187 \mid 22 : 40} \mid 14$$

Where X is the total relative length of the ramus,
Y is the relative length of the upper edge of the ramus,
K_f is the relative length of the terminal claw,
K_a is the relative length of the subterminal claw,
S_f is the relative length of the proximal seta,
S_a is the relative length of the dorsal seta,
N is the width of the ramus in the heigth of the dorsal seta.

The last, narrowing sector of the left side of the prehensile palp of the male resembles saw-teeth (Fig. 2g).

There is nothing known about the ecology and ethology of this species, although there are some data on its tolerance of ecological factors, but only in Lake Velence (Table 1).

The so far known distribution and habitats of the species: southern districts of the USSR as far as Harkov, the bay of Kuibishev, Lihats (BRONSTEIN, 1947) in Ukrainia, floodplains of the river Volga (KLIE, 1938), Germany (VAVRA, 1909; ILLIES, 1978).

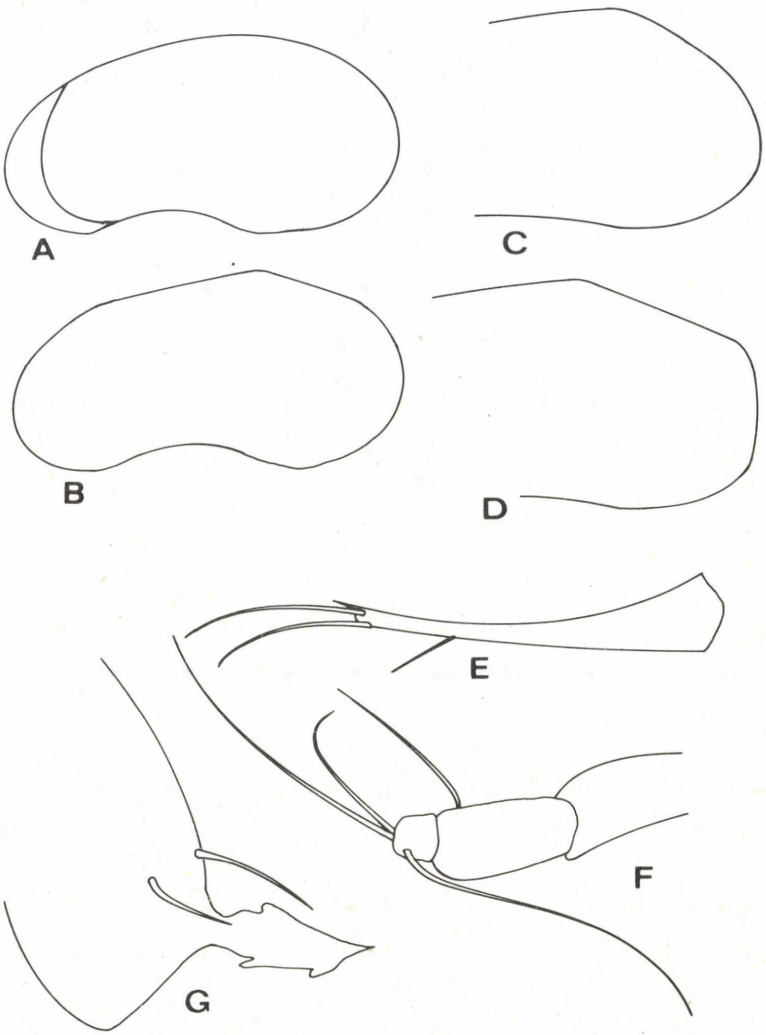

Fig. 2A-B, D-G. Candona holzkampfi Hartwig 1900
A= left valve (♂), B= right valve (♂), D= posterior margin of left valve (♀), E= furca (♀), F= third leg (♀), G= left prehensile palp of male.
Fig. 2C. Candona fabaeformis Fischer 1851
C= posterior margin of left valve (♀)

Physocypria fadeewi Dubowsky, 1926
(Podocopa - Cypridacea - Candonidae - Cyclocyprininae)

DUBOWSKY, 1926: 84, figs 10-18; SCHÄFER, 1934: 560, figs 1-6; HOLMES, 1937: 484-500; KLIE, 1938: 88-89, figs 311-315; ROME, 1943: 1-8; BRONSTEIN, 1947: 186-197, fig. 103; FARKAS, 1958: 40, fig. 39; PETKOVSKI, 1960: 117; SCHORNIKOV, 1961: 131-141; TRESSLER, 1966: 675, figs 28, 34; NÜCHTERLEIN, 1969: 254-255; HILLER, 1972: 441; BELDESCU, 1961: 7-13.

Synonyms: Physocypria kliei Schäfer, 1934; P. perlata Rome, 1943; P. kraepelini G. W. Müller, 1903 (Holmes, 1937); P. kliei Schäfer, 1934 (Klie, 1938); P. kliei Schäfer, 1934 (Petkovski, 1960); P. kliei Schäfer, 1934 (Hiller, 1972).

In Lake Velence it has been found at the following localities and dates (Fig. 1):

1975: Császár patak 11.08; Fürdető 06.08; Velence Schoenoplectus litoralis 06.08, 15.08; Tizedes tanya 06.08; Agárd 15.08. 1976: Alsóéri tisztás 06.04, 15.05, 16.08; Lángi-tisztás 15.05, 16.08; Kajtor 06.04, 15.05, 16.08; Császár patak 06.04, 15.05, 16,08; Német tisztás 15.05, 16.08; Vendel 06.04, 16.08; Nagytó-Rigya 16.08; Kiscserepes csapás 15.05, 16.08; Hollós tisztás 16.08; Templomtisztás 07.04, 17.08; Öregtisztás 17.08; Fürdető 07.04, 16.05, 17.08; Lucskos 07.04, 16.05, 17.08; Felső-tó 17.08; Pörös bokra 08.04. 1979: Alsóéri tisztás 06.08; Kajtor 06.08; Császár patak 06.08; Lángi tisztás 06.08; Vendel 06.08; Kiscserepes csapás 07.08; Hollós tisztás 07.08; Templomtisztás 09.08; Lucskos 09.08; Felső-tó 09.08; Égett-nád 09.08; Pörös bokra 09.08.

Table 1. Tolerance of three ostracod species to ecological factors

Ecological factors	Candona holzkampfi	Physocypria fadeewi	Potamocypris variegata
Temperature C^{o}	12	0.2-27.1	11.5-32.0
pH	9.0	7.0-11.1	7.4- 9.1
Ca mg. dm^{-3}	17-22	12-109.8	12-42
Mg mg. dm^{-3}	145-205	75-288	25-288
Na mg. dm^{-3}	213-360	165-362	165-362
K mg. dm^{-3}	37-68	29-72	29-72
CO_3 mg. dm^{-3}	114-228	48-228	48-228
HCO_3 mg. dm^{-3}	563-669	422-1068	422-1068
Cl mg. dm^{-3}	139-196	14-1170	18-212
SO_4 mg. dm^{-3}	241-420	205-420	205-420
Conductivity µS	2026-2889	886-3170	886-3170

Its valves are short, high and seen from above, they are rather narrow. The edge of the right valve is tuberculated on each side. The right valve is highest at its middle, being two-thirds of its length. The ventral side is straight, in some individuals slightly rounded. In top view both of its ends are rounded, its width is the greatest just behind its central part; here it is equal to half of its length (Fig. 3a, b). The natatory setae of both of the antennas are extremely long. The first joint of the maxilla is strongly swollen, the last joint is narrow, and three well developed smooth setae can be seen (Fig. 3h). The two setae on the third masticatory appendix are thickened and smooth. The second leg consists of five joints, the penultimate joint on the third leg is not divided, the last joint is short. Two of the three setae are of the same shortness and pale-like, but the third one is very long 18:18:100 (Fig. 3g). Its furca is well developed, the lower seta is more than two times longer than the width of the ramus at the height of the lower seta (Fig. 3g).

$$\begin{array}{c|c|c} 153 & 100 : 73 & 23 \\ \hline 145 & 37 : 53 & \end{array}$$

Dimensions of valves of the female: 1000 : 631 : 508 = 0.57 : 0.36 : 0.29
(Literature data for length: 0.61-0.67).

It may be found in a wide temperature range in its habitats. It can be found both in rivers and in small forest waters, in fishponds and in larger stagnant waters. It is a form tolerant of water-current. Its occurrence in sodic waters is a new finding, as it is known from the literature as a typical freshwater form (PETKOVSKI, 1977; NÜCHTERLEIN, 1969). The

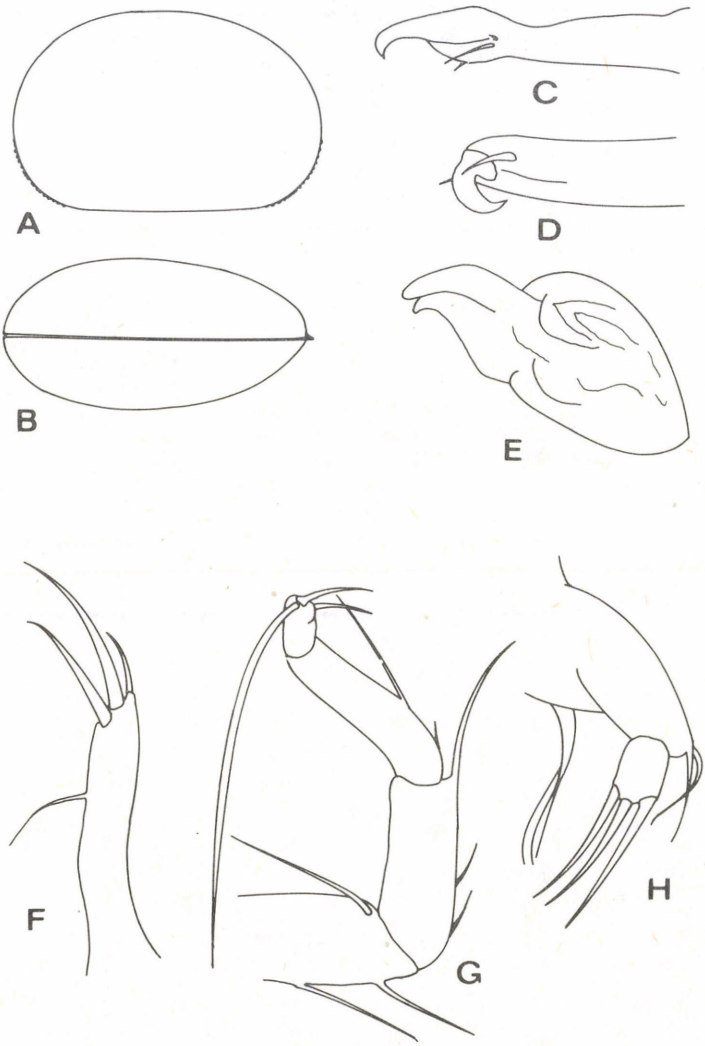

Fig. 3 Physocypria fadeewi Dubovsky 1926
A= right valve (♀), B= dorsal view of carapace (♀), C= right prehensile palp of male, D= left prehensile palp of male, E= hemipenis of male, F= furca (♀), G= third leg (♀), H= palp of maxilla (♀)

distribution of the species covers the southern areas of the USSR, district of Harkov (BRONSTEIN, 1947); Kubany (SCHORNIKOV, 1961); in Germany the Lake Schlawaer, in Poland the north-eastern areas (KLIE, 1938); in southern Europe Lake Prespa (PETKOVSKI, 1960); Lake Ochrid (HOLMES, 1937); Lake Mindel (PETKOVSKI, 1977) and the rivers of North America (TRESSLER, 1966).

Potamocypris variegata Brady & Norman, 1889
(Podocopa - Cypridacea - Cypridopsididae - Cypridopsinae)

BRADY et NORMAN, 1889: 91, figs 20-21; VÁVRA, 1898: 12; MÜLLER, 1900: 84, figs 3-4, 15-17, tab. 18; DADAY, 1900: 193; WOHLGEMUTH, 1914: 1-72; KLIE, 1923: 2-11; KLIE, 1926: 37-53; BRONSTEIN, 1925: 1-30; FURTOS, 1933: 413-524; KLIE, 1935: 3; KLIE, 1937: 5, figs 3-9; KLIE, 1938: 143-144, figs 482-485; KLIE, 1939: 174; KLIE, 1941: 233-244; GAUTHIER, 1937: 147, figs 1-2; BRONSTEIN, 1947: 169, fig. 87, tab. X; FARKAS, 1958: 33-34, fig. 31; PETKOVSKI, 1961: 29-52; TRESSLER, 1966: 723, figs 28, 168; NÜCHTERLEIN, 1969: 269-270; HILLER, 1972: 400-497; SYWULA, 1974: 255-271.

In Lake Velence it has been found at the following localities and dates:
1975: Vaskapu 08.08; Császár patak 11.08; Nagytó-Rigya 11.08; Fürdető 06.08; Velence (Schoenoplectus litoralis) 06.08, 15.08; Tizedes tanya 06.08; Agárd 15.08. 1976: Alsóéri tisztás 06.04; Császár patak 06.04; Nagytisztás 07.04; Fürdető 07.04, 16.05, 17.08; Templomtisztás 07.04; Öregtisztás 07.04, 16.05; Vereb-Pázmándi patak 17.08; Velence (Schoenoplectus litoralis) 07.04, 16.05, 17.08; Lucskos 07.04, 16.05, 17.08.

Male individuals are unknown, its reproduction is parthenogenetic. The right valve of the female is bigger, it covers the left valve on the back side. Length of the right valve is 0.67 mm (literature data: 0.51-0.57 mm), its height is somewhat greater than half of its length. The left valve is lower (Fig. 4a, b).

Seen from above, both ends of the valve are sharp, the greatest width can be measured at exactly half of its length. The natatory setae of the second antenna overlap the point of unguises on the two last joints (Fig. 4c). The penultimate joint of the second leg is divided, therefore the limb consists of five joints. The strong, well developed unguis of the last joint is elongatedly arched. There is a scratch on the third leg. The last joint of the antenna of the maxilla is widened, width of its proximal end is 100, and that of the distal end is 153 units. There are strong, short, unguis-like smooth setae on the joint (Fig. 4d). Its furca is rudimentary, flagelliform and both the upper and the lower setae are lacking. The flagellum of the furca is three times longer than the upper edge of the ramus, the lower unguis is well developed (Fig. 4e).

33	100 :	0
33	0 : 0	

Dimensions of the valves: 1000 : 550 : 400 = 0.67 : 0.37 : 0.27

It can be found in every type of water from spring till autumn. It prefers water densely covered with vegetation. In a few cases it has been found in rivers. Two-three generations are produced parthenogenetically annually. It seems to avoid waters of acidic character (Table 1).

Distribution of the species: rivers Volga and Oka (BRONSTEIN, 1947); river Raba in in Poland (SYWULA, 1974); fishponds in Germany and England (KLIE, 1938); Lake Scutari in the Balkans (PETKOVSKI, 1961); the nearest occurrence to Hungary the river Garam at Alsószecse (KLIE, 1939; FARKAS, 1958); and extralimital to Europe in Asia Minor (KLIE, 1938) and in the small lakes of Ohio in North America (TRESSLER, 1966).

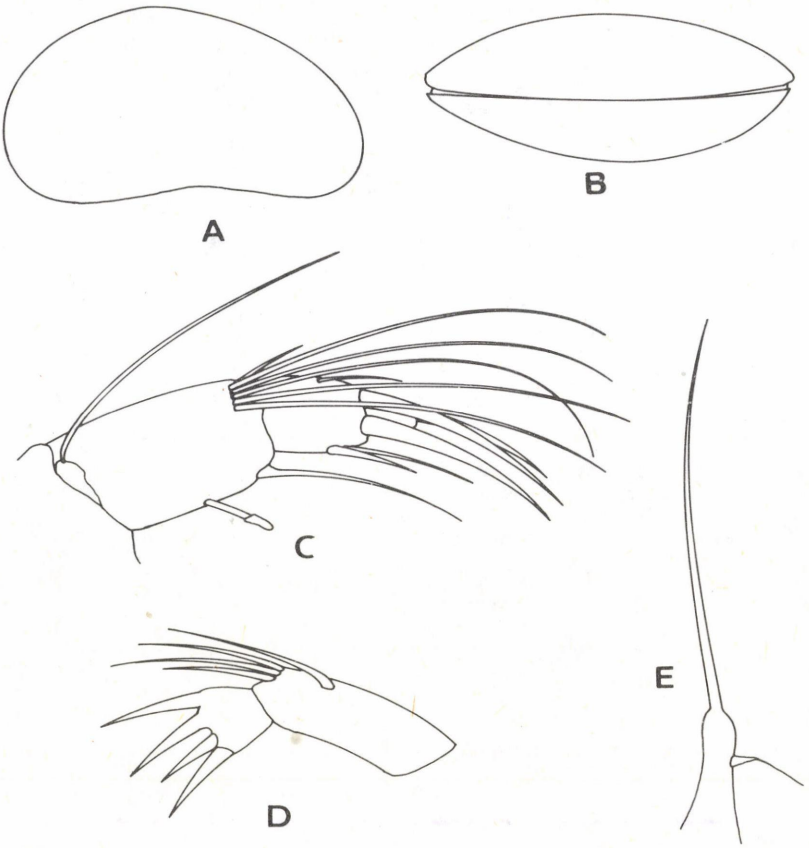

Fig. 4. Potamocypris variegata Brady & Norman 1889.
A= right valve (♀), B= dorsal view of carapace (♀), C= second antenna (♀), D= palp of maxilla (♀), E= furca (♀)

REFERENCES

BELDESCU, S. (1961): Ostracodes du complex d'etangs Crapina jyila. - Commun. Acad.Rep. Pop. Rom., 11: 1-13.

BRADY, G.S. & NORMAN, A. (1889): A monograph of the marine and freshwater Ostracoda of the North Atlantic and the North-Western Europe. I. - Podocopa. Sc. Trans. Dublin Soc., 2/4: 63-270.

BRONSTEIN, Z.S. (1925): Beiträge zur Kenntnis der Ostracoden fauna USSR und Persiens. - Arch. Naturgesch., 9: 1-30.

BRONSTEIN, Z.S. (1947): Fauna de l'USSR, Crustaces II/1. Ostracodes des eaux douces. - Moscov, p. 1-339.

DADAY, J. (1900): Magyarországi kagylósrákok magánrajza (Ostracoda Hungariae). - Franklin, Budapest, pp. 320.

DUBOWSKY, N.W. (1926): Bemerkungen über einige Ostracoden des Sewerny-Donets-Bassins.- Zool. Anz., 65: 269-280.
DUBOWSKY, N.W. (1926): Über zwei neue Ostracoden in Bassin des Sewerny (Nord) Donetz (Nebenfluss des Don). - Zool. Anz., 63: 81-88.
FARKAS, H. (1958): Ostracoda - Kagylósrákok - Fauna Hungariae, 39: 1-68.
FURTOS, N. (1933): The Ostracoda of Ohio.- Bull. Ohio biol. Surv., 29: 413-524.
GAUTHIER, H. (1937): Ostracodes et Cladoceres de l'Afrique du Nord 4-me note.- Bull. Soc. Hist. Nat. De l'Afrique su Nord, 28: 147-156.
HARTMANN, G. & PURI, H.S. (1974): Summary of neontological and paleontological classification of Ostracoda. - Mitt. Hamburg. Zool. Mus. Inst., 70: 7-73.
HARTWIG, W. (1900): Über eine neue Candona der Prowinz Brandenburg, Candona holzkampfi n. sp. - Sitzber. Ges. naturf. Fr. Berlin, Jahrg. 1900: 149-152.
HILLER, D. (1972): Untersuchungen zur Biologie und zur Ökologie limnischer Ostracoden aus der Umgebung von Hamburg.- Arch. Hydrobiol (Suppl), 40/4: 400-497.
HOLMES, P.F. (1937): Ostracoda of Lake Ohrid.- Arch. Hydrobiol., 31: 484-500.
ILLIES, J. (1978): Limnofauna Europaea (2nd Edition).- Stuttgart-New York-Amsterdam, 196-208.
KLIE, W. (1923): Beitrag zur Kenntnis der Süsswasser-Ostracoden Russlands.- Arb. Biol. Wolga-Station, Saratow, 7: 2-11.
KLIE, W. (1926): Zweiter Beitrag zur Kenntnis der Süsswasser-Ostracoden Russlands. - Arb. D. Biol. Wolga-Stat., 9: 37-53.
KLIE, W. (1935): Drei neue Höhlenostracoden aus der Umgebung von Laibach.- Zool. Anz., 111: 189-198.
KLIE, W. (1937): Ostracoden und Harpacticiden aus brackingen Gewässern an der Bulgarischen Küste des Schwarzen Meeres.- Mitt. Köngl. Natl. Inst. Sofia, 10: 1-42.
KLIE, W. (1938): Krebstiere oder Crustacea III. Ostracoda, Muschelkrebse. In: DAHL, F.: Die Tierwelt Deutschlands. 34: 1-230.
KLIE, W. (1939): Adatok Magyarország kagylósrák-faunájának ismeretéhez [Beiträge zur Kenntnis der Ostrakodenfauna Ungarns]. - Állatt. Közl., 36: 168-174.
KLIE, W. (1941): Süsswasser-Ostracoden aus Südosteuropa. - Zool. Anz., 133.(11-12): 233-244.
MÜLLER, G.W. (1912): Ostracoda.- Tierreich, 31: 1-434.
NÜCHTERLEIN, H. (1969): Süsswasser-Ostracoden aus Franden. Ein Beitrag zur Systematik und Ökologie der Ostracoden.-Int. Rev. ges. Hydrobiol. 54: 223-287.
PETKOVSKI, T.K. (1960): Zur Kenntnis der Crustaceen des Prespasees.- Fragmenta Balcanica. Mus. Mac. Sci. Nat., 15 (74): 117-131.
PETKOVSKI, T.K. (1961): Zur Kenntnis der Crustaceen des Skadar (Skutari) - Sees.- Acta. Mus. Mac. Sci. Nat., 2(70): 29-52.
PETKOVSKI, T.K. (1977): Ostracodenfauna des Mindelsees (S. W. Deutschland) - Acta. Mus. Mac. Sci. Nat. 3(128): 49-94.
ROME, D.R. (1943): Physocypria perlata, Cythereis rivulorum, Cypridopsis mariae, trois espéces nouveles d'eau douce.- Meded. K. nat. hist. Mus. Belg., 19: 1-8.
SCHÄFER, H.W. (1934): Beiträge zur Ostracodenkunde.- Bull. Soc. des Sci. de Cluj, 7: 559-565.
SCHORNIKOV, E.I. (1961): K izhutshenyu ostracod iz vodoemov delty Kubany.- Trudy Azhovskovo nautshno-issledovatelskovo Instituta rybnovo hozhiaistvo, p. 131-141.
SYWULA, T. (1974): The ostracods (Ostracoda) of the River Raba and of certain aquatic environments connected with it. - Acta Hydrobiol., 16 (3-4): 255-271.
TRESSLER, W.L. (1966): Ostracoda. In: EDMONSON, W.T.: Freshwater Biology.- p. 657-734.
VÁVRA, W. (1909): Ostracoda. Die Süsswasserfauna Deutschlands, 11.
WAGLER, E. (1927): Crustacea, Krebstiere. In BROHMER: Die Tierwelt Mitteleuropas, 2: 70-110.
WOHLGEMUTH, H. (1914): Beobachtungen und Untersuchungen über die Biologie der Süsswasser-Ostracoden, ihr Vorkommen in Sachsen und Böhmen, ihre Lebenswiese und ihre Fortpflanzung.- Int. Rev. ges Hidrobiol. Hydrogr., 6: 1-72.

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